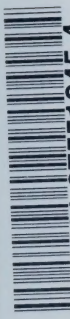


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Canada Mines Bureau of Explosives
Division



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CANADA
DEPARTMENT OF MINES
HON. CHARLES STEWART, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

EXPLOSIVES DIVISION
LT.-COL. G. OGILVIE, CHIEF INSPECTOR

ANNUAL REPORT

OF THE

EXPLOSIVES DIVISION

OF THE

DEPARTMENT OF MINES

FOR THE CALENDAR YEAR

1927



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1928

No. 23

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ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION OF THE DEPARTMENT OF MINES
FOR THE CALENDAR YEAR 1927

BY
Lt.-Col. G. Ogilvie, C.M.G.

The following report deals with the administration of the Explosives Act during the year ending December 31, 1927.

MANUFACTURE OF EXPLOSIVES

The operation throughout the year of the factory at Nobel, Ont., of the Canadian Explosives Limited, offset the closing of the factory at Dragon, P.Q., leaving, as formerly, three main sources of supply of high explosives, the Canadian Explosives at Belœil, P.Q., and the Canadian Giant at James Island, B.C., being the other two.

The National Explosives Company, included in the list given in Appendix A, ceased operations in August, and the Mexco Company changed the location of the small factory established at Silver Centre to Swastika, Ont. The only other changes in the list are that the New Brunswick Gas and Oilfields Company's plant is not now included—its operation having been purely of a temporary and special character—and that the new fireworks factory of the Dominion Fireworks Company has been added. This last commenced operations only at the close of the year.

Inspectors of the division made forty inspections of factories and found these being conducted in accordance with the regulations and terms of licence. In the case of the explosives factories proper, where the question of the safe manufacture and manipulation of high explosives is a constant study, these visits invariably give opportunity of discussion on points of special interest in the advancement of safety. The functioning of the safety committees among the employees of the larger factories, and the encouragement so given to employees, and acted upon by them, to bring forward criticisms and suggestions to the supervisory staffs, have unquestionably done much to direct the attention of operators to the important bearing on their own safety of many, apparently insignificant, details of procedure. It has further served to develop that faculty of observation, which, with constant exercise of care, is the basis of all safety measures.

In one fireworks factory, repeated evidence of carelessness observed by inspectors was brought to the notice of the proprietors and satisfactory conditions obtained on reorganization.

The production of explosives, given in Appendix B, shows an increase in explosives of Classes I to IV—high explosives and black powders—of approximately 1,900 tons or 10½ per cent over the production of 1926.

ACCIDENTS IN FACTORIES

One fatal accident and one other, involving injury to employees, occurred in licensed factories. The first was at the Dominion Cartridge Company's factory, Brownsburg, P.Q., on March 4, when a bundle of delay action electric detonators exploded while being waterproofed by dipping. The operator was so severely injured, by the explosion, particularly about the face and arms, as well as by burns, that he died while being conveyed to the hospital. The explosion detonated other detonators in the building to a number of not less than 10,000. This wrecked the building. Fire broke out and, aided by the wind, spread to other small buildings of light construction. These contained limited quantities of detonators at various stages of manufacture. One female employee, who was outside the dipping-room but near the door, received several wounds from fragments of detonators. Three other employees suffered minor injuries from the subsequent small explosions and fire. The efforts of the factory fire department succeeded in confining the damage to a small area. The explosion undoubtedly originated in the dipping-barrel, and may have been caused by an accidentally severe blow being given to the detonators when shaking off the surplus fluid. Advantage was taken of the opportunity afforded in the rebuilding of this section of the factory to improve the lay-out from the point of view of flow of work, and to embody several protective features in the design of the new buildings as well as to introduce the best equipment now available. A special report (No. 12) was rendered on this accident.

The second accident occurred in another section of the same factory on October 14. It was of an unusual character in that approximately 10,000 .22 B.B. primed shells exploded "en masse" on a light work bench, at which an operator was shaking the "shells" into a loading-plate preparatory to the charging and bulleting operation. The quantity of explosive involved only slightly exceeded one-third of a pound. The bench was wrecked and the operator, who had one leg extended under the bench, suffered a broken leg and lost the sight of one eye. Another employee, seated alongside of him, and whose duty it was to shake the bullets into a loading tray, had his ear drums split, but recovered his hearing after hospital treatment. At the time of the explosion the third man in the compartment was in the act of charging a plate at the powder wall receptacle. "Shells" and small debris were projected into this receptacle. There was no explosion here and this operator was not injured.

The explosion may have been initiated by a blow on a small portion of composition possibly adhering to the outside of a "shell," or by the accidental dropping of the loading-plate on a shell on the table, or by some other inadvertent action, but it was not to be expected that explosion would be communicated to the mass of shells. It transpired, however, that great difficulty had been found in keeping the walls of these rimfire shells truly clean after priming with the particular composition then in use, and, if not thoroughly clean, communication of explosion would undoubtedly be

more probable. Extensive experiments were made with short and long "shells" and explosion "en masse" was effected only in the case of the short shells and with the composition in question. The possibility of primed shells being capable of explosion "en masse" was not to be foreseen but modifications have been introduced in the priming operation to guard against the re-occurrence, so far as possible, of an unfortunate combination of circumstances as illustrated in this accident.

By the courtesy of the Quartermaster-General, information was received regarding a fatal accident which occurred at the Dominion Arsenal, Quebec. A considerable quantity of percussion caps for safety cartridges had been held for future manufacture in a small detached building, wherein were also other military stores. An "en masse" explosion of these caps occurred when two men were in the building arranging stores. Both men were killed, and the building wrecked. The cause of the accident can only be conjectured. It may have been brought about through the accidental dropping of a heavy piece of material on the caps, but the history of the caps pointed to the probability of the presence of broken composition and explosive dust, which might well account for explosion being initiated by less violent means.

There were no accidents involving injury to personnel in connexion with the manufacture of high explosives or fireworks, but interest attaches to the outbreak of fires, and to other incidents.

A black powder pulverizing house was partly destroyed by fire which originated in the hoppers. A charge of charcoal and sulphur had been emptied from the barrels to the hoppers late on a Friday afternoon. A second charge had been pulverized and left in the barrels on Saturday, and fire was observed on Sunday forenoon. The outbreak may be attributed to spontaneous combustion of the sulphur and charcoal mixture left in the hoppers.

A building, temporarily used for the storage of ingredients including perchlorates, sodium chlorate and ammonium nitrate, also paper and paraffin, was completely destroyed by fire. Careful investigation failed to suggest possibility of the fire having been started by any external agency, either accidental or malicious. The first indication of fire observed was the issue of red fumes and smoke from the building. The several stores in the building had been arranged in an orderly manner, but it is possible that, while the materials were being conveyed into the house and placed in their allotted positions, small spillings of one may well have become mixed with the others, and such a small admixture of a chlorate with an ammonium salt is very liable to give rise to spontaneous combustion. The building was not in the "danger area" and was indeed well isolated, but although no risk to personnel was involved, it points to the desirability of always providing separate storage for chlorates.

In a nitro-glycerine plant a case was observed of spontaneous decomposition of nitro-glycerine in sawdust which had been collected in a small bag for removal, after being used in cleaning out a sump tank in a waste acid house. There was no attendant danger but the incident is of interest to record as one of observed decomposition.

On two separate occasions, and in the same small fireworks factory, huts were burned down during the night. They were in an open, isolated

location and, by chance, the hut which was destroyed on one of the occasions had been inspected late on the afternoon preceding the fire and was noted to have been left in good order and cleared out of ingredients or material likely to involve any fire risk. It is probable that both these fires were due to the action of trespassers.

MAGAZINES

The number of magazines under licence, 272, showed an increase of 19. In addition to this, temporary magazine licences were issued covering the operation of 197 magazines, 21 more than in the previous year.

One permanent magazine was forcibly entered and a case containing 5,000 detonators stolen. Four cases of dynamite were taken from a temporary magazine in a construction camp.

No accident involving explosion or fire occurred in connexion with the operation of licensed magazines.

One contractor's magazine, for the keeping of explosives for use in harbour construction, at Port Colborne on lake Erie, was swept from the crib on which it was built by the very severe storms of December. The small detonator magazine was also wrecked. In all, 747 cases of 75 per cent Polar Gelatin dynamite and 18 cases of waterproofed electric detonators were swept into the lake. In conducting the salvaging operation the contractors were assisted by a representative of the manufacturers, and the explosives chemist, sent from this division, examined and tested the recovered explosives, to determine their fitness for use or otherwise. All the electric detonators were recovered, and after extensive tests all were found in serviceable condition. Boys in the vicinity were well warned of the danger of meddling with explosives washed ashore, and, indeed, some gave good service in the search which was conducted. In all, 427 cases were repacked with serviceable dynamite and the remainder destroyed.

A strict visual examination of the dynamite was made, and it is probable at least a portion of that destroyed might have been serviceable.

The magazines were generally well maintained, such improvements as were called for in some cases being carried out on their need being brought to the attention of the owners. Inspectors' visits have, and serve, a further purpose than the enforcement of the regulations and promotion of good conditions of maintenance, in that touch is kept with changing circumstances, such as the encroachment of other buildings or of roads in the vicinity of magazines. Not infrequently too, there may be the question of a magazine which, while of acceptable construction, and so licensed, could with advantage be altered or replaced on a suitable opportunity. In such cases, and whether by reason of encroachments the change in location is urgent, or the time seems favourable for the effecting of a desired improvement, the subject is discussed with the licensees. They are nearly always ready to give favourable consideration to recommendations for the betterment of the conditions, and, as a result, the types of magazines in use, particularly in the case of the smaller magazines, show by the utilization of materials and labour available to the best possible advantage, a growing evidence of appreciation of what a magazine should be.

A total of 267 visits of inspection was made to magazines by the inspectors of the division and 126 by deputy-inspectors of the Royal Canadian Mounted Police.

EXPLOSIVES FOUND OR STOLEN

Two cases of theft of explosives were reported besides the thefts from magazines already mentioned. In one, approximately 350 detonators were removed from a contractor's store. They were not recovered. Steps were taken by the Royal Canadian Mounted Police towards the instruction and cautioning children in the neighbourhood, lest any of these detonators should come into their possession. Nearly 800 detonators were stolen from another contractor's store by two youths who were later apprehended, convicted on a charge of "breaking and entering," and sentenced to terms in a reformatory. Unfortunately a third lad received injuries to his eyes and hands by the explosion of one of these detonators, to which he had applied a lighted match. Most of the detonators had been exploded by the youths, but all were accounted for.

There are very few instances of the finding of explosives to record. About three pounds of dynamite were found so prepared, and under such circumstances, as to point to an intended outrage. They were handed over to municipal police and destroyed.

A new tenant of a town house, which had been unoccupied for a time, found eleven dynamite cartridges in the coal cellar. Their presence was probably due to the foolish and dangerous method adopted by some person of disposing of them, rather than to any malicious intent. Boys, playing near a railway, found four dynamite cartridges which had apparently been a long time exposed and handed them over to a work gang for destruction. Another interesting case, and where the boys concerned exercised a wise discretion, was the finding of a tin of detonators on an island in the Athabaska river. The boys, ten years of age, who found them handed them over to their school teacher who, in turn, passed them to the Royal Canadian Mounted Police by whom they were destroyed.

About 600 pounds of ingredients for an unauthorized explosive were located by the Royal Canadian Mounted Police in a barn—where they had apparently lain for several years—in time to frustrate the designs of school children for a display. The materials were removed, the owner traced and his consent to their destruction obtained.

EXPLOSIVES CONDEMNED ON INSPECTION

Seven considerable stocks of high explosives, totalling 2,008 cases or approximately 100,400 pounds were condemned. These were of varying ages, and, while they included some which, in apparently fair condition, were voluntarily destroyed by the owners, they were mostly condemned on account of deterioration accelerated by exposure when held on outlying operations. In addition to this, quantities varying from 30 pounds to 400 pounds, totalling 1,720 pounds, and distributed over 11 magazines were condemned on inspection and destroyed.

Black blasting powders to the amount of 2,375 pounds, from three magazines, were destroyed; also one lot of 1,500 detonators and one of 400 obsolete and unsaleable electric safety fuses.

Forty packages of unauthorized safety cartridges, found in five stores, were withdrawn.

There were no condemnations of fireworks in store, but large rejections were made of fireworks offered for importation to which reference will be made later.

UNLICENSED PREMISES

About 700 visits of inspection were made to unlicensed premises by inspectors of the division and 2,200 by deputy-inspectors of the Royal Canadian Mounted Police. By the admirable work of these deputy-inspectors, in the enforcement of the regulations, instructions in good and lawful practice is carried to all parts of the country, to an extent and in a manner which would not otherwise be economically possible. As stated in the last report difficulty had been experienced in supplementing the comparatively few possible visits of inspectors by those of deputy-inspectors to the extent desired. This was inevitable on account of the many and more important demands then made on the services of the few members of the Royal Canadian Mounted Police available in these districts. This has been largely overcome by the special patrols made possible this year. These patrols have been carried out in the Maritime district by use of a hired car and, in the Quebec district, by car owned by the division. The inspections so made, while covering a number of stores not previously visited, have proved of great value in the enforcement of the regulations, and in the promise they hold of re-inspections being made at less infrequent intervals.

IMPORTATIONS

The quantities of explosives of the various classes imported during the year are given in Appendix C; 664 permits and 40 special permits were issued.

The explosives, other than fireworks, were nearly all for delivery to factories, as propellant powders for use in safety cartridges, or nitro-cotton for incorporation in the manufacture of high explosives or lacquers. There were no rejections of shipments of such explosives and the control of their importation was not attended by any difficulty.

Fireworks manufactured in organized foreign factories likewise were dealt with easily. The foreign manufacturer having first presented his goods for authorization and obtained a ruling thereon, understands that only such goods as have been authorized will be allowed entry, and hence he need offer only such goods to Canadian dealers.

The rejections of Chinese fireworks presented for importation have, however, again been considerable. Consignments for points in Western Canada have been examined at Vancouver where deputy-inspectors of the Royal Canadian Mounted Police, acting in conjunction with the customs officials have made examinations and, when necessary, have selected samples for chemical determination. Promptness in the conduct of this

work has been effected by the valued co-operation of the Dominion Analyst who dealt with it in his laboratory at Vancouver. At this port of entry nearly 27 per cent of the fireworks presented, and representing nearly 8 tons, had to be refused admission.

Samples were selected from deliveries made at points in Eastern Canada by the collectors of customs and forwarded to Ottawa for examination. The actual rejections, following on these examinations, have been relatively insignificant. This is due to the action latterly taken by the wholesale dealers in the United States—through whom the orders are mostly placed—in overhauling the shipments when received by them, and forwarding samples for preliminary examination at Ottawa, without prejudice to later examination at ports of entry. Many of these samples were found to contain unauthorized explosives and by the exercise of this precaution not only has much useless and costly freighting been avoided, but replacements are made possible before it is too late to benefit the Canadian importers.

Towards the end of the year it was gratifying to observe some evidence that the pressure brought by these rejections, direct or indirect, was causing greater care to be exercised by the exporters in China to supply fireworks in conformity with the instructions given with the orders.

AUTHORIZATION OF EXPLOSIVES

One new explosive was presented for authorization, examined and accepted. A total of 186 samples of manufactured fireworks was submitted of which 79 were authorized and 107 rejected. The list of authorized explosives is given in Appendix E.

PROSECUTIONS

Proceedings were taken in sixteen cases for violation of the regulations. One, a charge of failing to safeguard explosives awaiting transshipment, was dismissed. Convictions were obtained in the others and fines imposed, the offences being:

Exceeding the quantity of explosives permitted to be kept elsewhere than in licensed factories or magazines.....	1
Keeping explosives otherwise than in the manner prescribed for such keeping in unlicensed premises:	
(a) not being in locked receptacles.....	2
(b) failing to keep blasting cartridges separately from detonators..	3
Failing to keep records of receipts and issues of explosives.....	8
Drunk when in charge of a vehicle conveying explosives.....	1

GENERAL

The summary of accidents (Appendix D) shows a slight decrease in those occurring in the use of explosives or arising from various causes: not sufficient, however, or covering a period long enough, to give ground for presuming that it is an indication of general improvement, but, coincident as it is with an increase in the consumption of explosives, it is at least an encouraging sign.

The accidents in use, when classified according to attributed causes, do not give particularly striking figures under any one head, although failure to take proper cover nearly always heads the list, and closely akin to this are the accidents classed as caused by projected debris. The main object of the publication of these summaries is to put the causes of accidents before consumers of explosives, that they may have the support such data can give when cautioning their employees against practices calculated to add to the risk of accident. It has been observed that considerable use has so been made of them.

A slight decrease is noticeable in the number of accidents arising from playing with detonators, which nevertheless continue to be much too frequent. Following on conferences with the educational authorities in the several provinces, an illustrated and descriptive leaflet on detonators was prepared, and supplies furnished to the Departments of Education in each of the western provinces, as well as Quebec and Nova Scotia. These departments not only arranged for the distribution of the leaflets on suitable opportunities, but extended their most helpful co-operation by calling attention to the matter through such educational journals, bulletins or circulars as could serve as media. With the concurrence of the Department of Education of Ontario, the leaflets, with covering notes, are being issued by the Explosives Division direct to all schools and inspectors of schools in that province. Supplies have also been furnished to other interested parties and to the Royal Canadian Mounted Police for assistance in the instructional and preventative work continually being carried on by them.

APPENDIX A

Factories Licensed to Manufacture Explosives in 1927

Owner	Location of factory	General nature of product	Remarks
Canadian Explosives, Ltd...	Belœil, Que.....	Blasting explosives, black powders, propellants.	
Canadian Giant, Ltd.....	James Island, B.C..	Blasting explosives, black powders.	
Canadian Explosives, Ltd...	Nobel, Ont.....	Blasting explosives.	
National Explosives Co., Ltd.	Camp Mohawk, Ont.	Blasting explosives.....	Closed Aug. 1927.
North Star Explosives Co., Ltd.	Prescott, Ont.....	Fulminate of mercury...	Operation intermittent.
Mexco Co.....	Swastika, Ont.....	Blasting explosives.	
Dominion Cartridge Co., Ltd.	Brownsburg, Que...	Ammunition, detonators, etc.	
Canadian Safety Fuse Co....	Brownsburg, Que...	Safety fuse.	
T. W. Hand Fireworks Co., Ltd.....	Hamilton, Ont.....	Fireworks.	
Toronto Fireworks Co.....	Toronto, Ont.....	Fireworks.	
Dominion Fireworks Manufacturing Co.....	Dixie, Ont.....	Fireworks.	
Dominico Ruffo.....	Cornwall, Ont.....	Fireworks.....	Operation intermittent.
B. Marroni.....	St. Pierre, Que....	Fireworks.....	Operation intermittent.

APPENDIX B

Production of Explosives in Canadian Factories during the Year 1927

	Quantity
Class I. Gunpowder.....	347,286 lb.
“ II. Nitrate mixtures.....	1,305,500 “
“ III. Nitro-compounds— Division 1.....	37,953,680 “
“ IV. Chlorate mixtures— Division 1.....	178,841 “
“ V. Fulminates— Division 1.....	86,688 “
“ VI. *Ammunition— Division 1.....	75,035,898
Safety cartridges.....	Output of one factory.
Safety fuse.....	Output of one factory.
Railway torpedoes.....	2,024,400
Percussion caps.....	
Division 3.....	
Detonators and electric detonators.....	Output of one factory.
“ VII. Fireworks— Division 2.....	(approx.) \$ 226,000

*Exclusive of artillery ammunition.

APPENDIX C

Explosives imported into Canada January 1 to December 31, 1927

Class	Division	Description	Quantity
I	Gunpowder.....	3,500 lb.
II	Nitrate mixtures.....	152,450 "
III	1	Mixtures containing liquid nitro-compounds.....	5,216 "
	2	Nitro-compounds—	
		(a) Propellants.....	67,855 "
		(b) For use in explosives factories.....	573,207 "
		(c) For other manufacturing purposes.....	704,855 "
V	1	Fulminates.....	27,000 "
VI	1	Percussion caps.....	13,500
		Safety fuse.....	100 ft.
	2	Miner's squibs.....	300
		Detonating fuse.....	296,460 ft.
	3	Detonators and electric detonators.....	22,600
VII	2	Manufactured fireworks.....	(approx.) 546,588 lb.

APPENDIX D—Continued

Playing with Detonators

Cause of Accident	Killed	Injured
Boy, age 9, was extracting composition from a detonator with a needle when it exploded. Three fingers of left hand and index finger of right hand were injured.....		1
Two girls, ages 4 and 3, found a box of detonators in their father's chicken house. While playing with them explosion occurred. The older girl died from injuries, the younger received cuts in the arms, face, and legs. It exploded. The boy lost thumb and two fingers of right hand.....	1	1
Boy, age 6, found detonators on vacant lot, and placed one on kitchen stove. It exploded. The boy lost thumb and two fingers of right hand.....		1
Boy, age 8, found detonators in chicken house and accidentally exploded one. His left hand, face and chest were injured.....		1
Boy, age 7, was playing with a detonator when it exploded. He lost the tips of three fingers of left hand and received other injuries to face and eyes..		1
Boy, age 12, received a detonator from a companion. He exploded it by striking it with a stone and lost three fingers of his right hand.....		1
Boy, age 12, found a fused detonator in a brickyard. He applied a match to the fuse, the detonator exploded. He lost thumb and index finger of right hand.....		1
Boy, age 12, found detonators in a pail on a neighbour's farm. He tried, in school, to remove composition from one with a pin. It exploded. He lost thumb and two fingers of left hand. His right hand was also injured.		1
Boy was playing with a detonator. It exploded in his hand. He lost two fingers and received painful injuries to his face.....		1
Two boys, ages 17 and 16, found two detonators on an island. The elder picked one with a penknife causing it to explode. He lost three fingers, and his companion lost his left eye.....		2
Two girls and one boy, while playing in barn on their father's farm dislodged a box of detonators from a beam. The detonators exploded. The boy age 6, and one girl, age 3, died from injuries. The second girl received numerous injuries to body and face.....	2	1
Two boys, age 12 and 11, found 21 detonators in old shack, near to which building operations had previously been in progress. While one boy was examining one with his knife it exploded. Both boys received numerous body wounds.....		2
Boy, age 8, found E.B. cap in lane near his home. He attached the wires of an old battery, and so fired the cap. He lost three fingers of right hand, and his sister (6) received injuries to arms, face, and chest.....		2
Boy, age 6, found three detonators on the site of an old shack which had been removed. He applied a match to one. It exploded. All fingers of one hand were destroyed, necessitating amputation at the wrist....		1
Boy, age 13, found detonators in an ice-house. While picking one with a pin it exploded. He lost thumb and three fingers of left hand, and thumb of right hand.....		1
Boy, age 14, found a detonator and struck it with a stone, causing explosion. He received severe bruises about the left eye, chest, face, and left hand.		1
Boy, age 14, received a detonator from a companion, and exploded it by means of a lighted paper. He lost three fingers of left hand.....		1
Boy, age 12, thought a detonator given him by his sister was lip rouge. He cut it with a knife, causing explosion. One eye was totally destroyed and the second gravely injured.....		1
Boy, age 13, found detonator among loose rock, near a mine. He exploded it by hitting with a stone. He lost sight of right eye and received injuries to face and hands.....		1
Boy playing with a detonator, accidentally exploded it. He received severe injuries to hands and face.....		1
Boy, age 11, was playing with a detonator. It exploded in his hand. He lost a thumb and two fingers.....		1
Three boys, helping to remove debris from a cellar, found some detonators. One put them in his coat pocket, and then dusted his coat by striking it against the wall. The detonators exploded injuring all three boys....		3

APPENDIX D—Continued**Playing with Detonators**

Cause of Accident	Killed	Injured
Boy, age 16, found detonator with fuse attached. He applied a match to the fuse, exploding the detonator. Three fingers of one hand were severely injured, necessitating amputation.....		1
Boy, age 5, took detonator from high shelf (12 feet) in his father's house. While playing with it explosion occurred. He died from injuries.....	1	
Boy stole detonators from a magazine, and gave one to another boy. He applied a match to it and suffered severe injuries to his hands and eyes from the explosion.....		1
	4	29

APPENDIX D—Continued

Playing with Explosives

Cause of Accident	Killed	Injured
Boy found an old gun barrel containing a cartridge. While playing with the latter, he exploded it, and received injuries to his face and right eye....		1
Boy, age 4, picked up an ignited firecracker, which exploded in his face. He received injuries to one eye.		1
Boy, age 6, blew on the fuse of a firecracker, to hasten ignition. The cracker exploded injuring his eyes.		1
Boy found blasting powder and applied a match. It exploded. His hands were severely burned, necessitating partial amputation of one.		1
Boy, age 9, setting off a firecracker, which exploded in his hand, received severe burns to face and forehead.		1
Boy lost part of one hand by the explosion of a large firecracker.		1
Two youths mixed potassium chlorate, sulphur, and charcoal, and with the mixture charged an iron pipe. Some of the mixture was on the pipe threading and this was exploded when the cap was being screwed on. One lad had both hands blown off while the other received injuries to the face.		2
Boy, age 11, extracted powder from a shotshell, placed it in a tin box and applied a light. It exploded in his face severely injuring both eyes.		1
Man, age 27, suffered a fractured jaw from the explosion of a firecracker which he was setting off.		1
Boy, playing with firecrackers, was severely burned. He was confined to hospital for two months.		1
Three boys found a railway torpedo and struck it with a stone. The explosion inflicted minor injuries on all three.		3
Boy, age 16, when dynamiting fish, lost his right arm by the explosion of a dynamite cartridge in his hand.		1
Three boys found loose cordite near a dismantled factory. They lit one strand, dropped it in alarm on to the remainder, and were severely burned.		3
Three boys, in a Hallow-e'en celebration, exploded dynamite in a lead pipe. One boy was injured by the flying debris.		1
Total.		19

APPENDIX D—*Continued*

Various

Cause of Accident	Killed	Injured
The explosion of a firecracker caused a team of horses to bolt. The teamster was thrown and received injuries which proved fatal.....	1	
Girl used an iron box containing detonators as stand for her hot iron. The detonators exploded and she was severely wounded by pieces of flying metal.....		1
Woman, age 74, burned some rubbish, containing a 22 R.F. cartridge. She was slightly injured by the explosion.....		1
Explosives among pieces of wood caused an explosion in a stove. One boy lost an eye and another was severely cut about the face and body by flying metal.....		2
While handling percussion caps, in a factory storehouse, an explosion occurred by which two men were killed. <i>See text factory accidents</i>	2	
Total.....	3	4

APPENDIX E

Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

*Burrowite Explosives, Ltd.

Burrowites Nos. 1, 2, and 3.

Canadian Explosives, Ltd.

Polar dynamite—25, 30, 35, 40, 45, 50, and 60 per cent.

Polar dynamite, mining—35, 40, 45, and 50 per cent.

Polar gelatinized dynamite—50, 60, 65, 70, and 75 per cent.

Polar ammonia dynamite—20, 25, 30, 35, 40, 45, 50, 55, and 60 per cent.

Polar ammonia dynamite, mining—25, 30, 35, 40, 45, 50, 55, and 60 per cent.

Polar forcite gelatin—30, 35, 40, 45, 50, 60, 75, 80, and 85 per cent.

Monobel No. 1.

Polar Monobel No. 3.

Viking No. 1.

Polar CXL-ite.

Stumping powders Nos. 1, 2, and extra.

C.X.L. Special No. 1.

Solid Nitroglycerine (S.N.G.).

Safety fuse lighters.

Signal bombs.

Railway torpedoes.

Railway fusees.

Cordite Mark 1 and M.D.

Gunpowder.

Black blasting powder.

Canadian Safety Fuse Co., Ltd.

Safety fuse—"Clover" brand.

Safety fuse—"Beaver" brand.

Safety fuse—"White Jacket" brand.

Safety fuse—"Crown" brand.

Dominion Cartridge Co., Ltd.

Ammunition.

Detonators.

Percussion caps.

Railway torpedoes.

Electric detonators.

Railway fusees.

Canadian Giant, Ltd.

Straight dynamite—25, 30, 35, 40, 45, 50, and 60 per cent.

Gelatinized dynamite—50, 60, 65, 70, and 75 per cent.

Ammonia dynamite—20, 25, 30, 35, 40, 50, 60, and 40, 45, and 55 per cent, special

Gelatin dynamite special—30, 35, 40, 50, 60, and 75 per cent.

Gelatin dynamite—30, 35, 40, 45, 50, 60, 70, 75, 80, and 85 per cent.

Export gelignites—42, 50, 51, 58, and 62 per cent.

Gelignite—75 per cent.

Samsonite—50 and 60 per cent.

West Monobel and Monobel—Nos. 1, 2, 3, 4, and 6.

Miners Friend—Nos. 6 and 9.

Coalite G.

Viking No. 1.

Polar CXL-ite.

APPENDIX E—*Continued***Authorized Explosives**

Polar Dynobel No. 4.
 Gelpermite No. 1.
 Stumping powders—Nos. 1 and 2 extra and L.F. 20 per cent.
 C.X.L. Special No. 1.
 Solid Nitroglycerine (S.N.G.).
 Black blasting powder.

Mexco Ltd.

Klorex, Nos. 1 and 2.

North Star Explosives Co., Ltd.

Fulminate of mercury.

*National Explosives, Ltd.

Rivite 50, 60, and 60 K.

Olympic dynamite.

Stumping xx, xxx, and special.

Olympite A, B, C, E, F, and X.

Gran-ite 30, 35, 40, 45, 60, and xx (strength 50).

*Northern Explosives, Ltd.

Northern dynamite—15, 17, 20, 25, 27, 30, 33, 35, 40, 45, 50, 60, 70, and 75 per cent.

Mole Brand dynamite—17, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Northern Stumping—No. 1, 20 per cent, and No. 2, 25 per cent.

Northern Gelatin—25, 30, 35, 40, 45, 50, 60, 75, 80, and 90 per cent.

Gelatinized dynamite—40 and 75 per cent.

Northern Gelatin—25, 30, 35, 40, 45, 50, 60, 75, 80, and 90 per cent.

Northern Liftite—A and AA.

Northern Stumping—Special.

Mole Brand L.D.—40, 50, 55, and 60 per cent.

All these brands of explosives are also manufactured in the low-freezing varieties.

*Thompson Powder Co., Ltd.

Thompsonites Nos. 1, 2, 3, and 4.

All explosives on the British authorized list are provisionally authorized in Canada, and in addition, those manufactured by the following firms, as detailed below:—

Aetna Explosives Co., Inc.

Standard dynamite L.F.—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Straight dynamite—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Keystone standard gelatin—40, 60, and 75 per cent.

Stumping powders—20 and 30 per cent.

American Glycerine Co.

Nitroglycerine.

Atlas Powder Co.

Electric blasting caps, Nos. 6, 7, and 8.

Blasting caps, Nos. 6, 7, and 8.

Nitrocellulose.

Trinitrotoluene.

California Cap Co.

Detonators.

* These companies have ceased manufacture, but authorized explosives furnished by them have not been completely expended.

APPENDIX E—*Continued***Authorized Explosives**

Dunmore National Chemical Co.

Regina Stumping powder Nos. 1 and 2.

Regina Rock powder Nos. 1 and 2.

E. I. Dupont de Nemours & Company, Inc.

Dupont bulk rifle powders (Nos. 80, 90, 91, 92) Rifle No. 1 Schuetzen.

Dupont smokeless shotgun powder.

Dupont pistol powders Nos. 3 and 5.

Dupont sporting rifle powders Nos. 95, 96, and 93.

Dupont military rifle powders (M.R. No. 20-23) (Nos. 10, 21, 22, 30, 40 and 50).

Dupont gallery rifle powder No. 75.

Dupont Schultze smokeless shotgun powder.

Ballistite smokeless shotgun powder.

Improved military rifle powders Nos. 13, 15, 15½, 16, 17, 17½, 18, 23, 25, and 25½.

Dupont dense smokeless shotgun powder.

Fulminate of mercury.

Guncotton.

Trinitrotoluene.

Ensign-Bickford Co.

Cordeau-Bickford fuse.

Hercules Powder Co.

Bullseye revolver powder.

Infallible smokeless shotgun powder.

Independent Torpedo Co.

Nitroglycerine.

Puget Sound and Alaska Powder Co.

Gelatin dynamite—25, 30, 35, 40, and 60 per cent.

Dynamite, L.F.—20, 30, 40, and 60 per cent.

United Railway Signal Corporation.

Railway torpedoes.

Western Cartridge Co.

Detonators.

Fireworks as manufactured by the following Canadian makers, namely:—

T. W. Hand Co. Ltd.

D. Ruffo.

Toronto Fireworks Co., Ltd.

Dominion Fireworks Manufacturing Co.

Berardo Marroni.

Certain fireworks manufactured by the following foreign makers, namely:—

Rochester Fireworks Company.

M. Backes Sons, Inc.

Hitt Fireworks Co. Inc.

A. Jedel.

Kilgore Manufacturing Co.

National Fireworks Inc.

Victory Sparkler Co.

Essex Specialty Co.

Edwards Co.

Federal Buster Corporation.

Los Angeles Fireworks Co.

Geb. Weinrich.

APPENDIX E—*Concluded***Authorized Explosives**

Fred. Wicke.
Ying Shing Loong.
M. Wagner.
J. F. Eisfeld.
International Fireworks Co.
Edmiston Manufacturing Co.
Adrian and Rohde.
Hamburg-Bremer Handelgesellschaft.
A.G. für Anilinfabrikation.
Wilhelm Fischer.
Potts Fireworks Display Co.
Antonelli Fireworks Co.
Safety Automatic Toy Co.
American Fireworks Co.
Blumberg & Co.
Standard Railway Fusee Corp.
Unexcelled Manufacturing Co. Inc.

Also Chinese firecrackers with gunpowder composition and not exceeding 4 inches in length and nine-sixteenth inch in diameter, and such other varieties the authorization of which has been specially notified to the parties immediately concerned.

